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A KEY FOR THE GENUS ERICA L. USING EDGE-PUNCHED CARDS

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Abstract

The need for a flexible key for a large and incompletely known genus and a method of adapting the punched card system for such a purpose is discussed. An application for the genus Erica is reviewed with recommendations from experience in its use.

Uittreksel

Die behoefte aan 'n aanpasbare sleutel vir 'n groot, onvolledige bekende geslag en 'n metode om 'n ponskaartstelsel hiervoor aan te pas word bespreek. Die toepassing op die geslag. Erica word behandel met aanbevelings voortspruitend uit gebruiksondervinding.

Introduction

A key of the usual type found in taxonomic monographs was published for the genus *Erica* L. in Thistleton-Dyer's Flora Capensis, by Guthrie and Bolus (1909). This key has proved somewhat unsatisfactory for a number of reasons. Firstly, there has been no convenient way of including the leads for the many new species discovered subsequently. Secondly, the 469 species given are arranged in 41 sections, which by their nature call for very finely detailed interpretations in the key, making it generally inconvenient to use. These sections have become all the more difficult to distinguish in the light of further studies of species variation and newly discovered taxa. The system described below has been designed and studied as an alternative.

A key using edge-punched cards

The method that was followed involves the use of a set of cards bearing the species' data, together with a sorting system. Each species' characters are first written in the respective positions on the card (Fig. 1). The card used in the present study measures approximately 25 × 17 cm and in addition to the printed information has 168 numbered holes punched close to the margin. The states of the most important key characters are shown by whether or not certain corresponding holes have their sides punched so that they are open to the margin (Fig. 1). The cards are sorted in the usual manner by bringing the cards together and inserting a needle in a hole corresponding to a character which is known in the specimen, dividing the pack and continuing with other characteristics until only one or a few cards are left.

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A portion of the list of characters used in preparing the key in the present case is shown in Table 1. For many properties, several holes had to be used to give a full enough coding of the information. The number of leaves borne at a node may be 2, 3, 4 or 5—6 (or irregular), corresponding to punch-outs at hole numbers 13, 14, 15 and 16 respectively. If a species should vary and have 3 to 4 leaves per node, the punch-out would be at holes 14 and 15 to reflect this variation. For a few properties, only one hole-position is necessary. Leaves may be either viscid (perhaps with some hairs gland-tipped) or not, so that hole 36 would, or would not, correspondingly be punched. The very complex forms shown by some properties, such as corolla-shape, are reflected in the coding by recording the basic structures in one set of holes and giving various qualifications in others.

Some accessory information is not coded but, being written on the card, it can be used as a guide in confirming an identification. This includes data on flowering-time and distribution. It has proved helpful to add references to publications (Fig. 1).

Use of the key

Experience has shown that the following steps should be followed in using the key:

(1) Arrangements of cards: Although the cards need not be arranged in any particular order it has been found that for ease of use they should be arranged into groups thus:—

(a) Major Groups: Group 1—*Syringodea* and *Stellanthe*; Group 2. *Euerica*; Group 3. *Chlamydanthe* and *Platystoma*. These groups are nearly fully reliable but, when the group to which a specimen belongs is in doubt, it will have to be looked for in two groups but very rarely more. In such a case the groups should be kept separate to avoid mixing up the cards.

(b) Leaf-arrangement Groups: The cards of each Major Group are divided into those having 2-3-nate; 4-nate; 5-6-nate or irregular leaf arrangements.

(c) Ease-of-handling Groups: After dividing up the pack as above a special, deeper, plain card is placed between each major group and between the various leaf groups. Then further plain cards are placed between each group of about 25—30 cards, a number suitable for handling at one time. If too many are taken together on the needle one or more may fail to drop out.

Fig. 1.

A copy of one of the edge-punched cards used for the key of Erica L.
Slightly reduced.

Flora Capensis No. 359 Flora of Cape Peninsula No. Sp. Nov.

ERICA ADUNCA Benth. in D.C. Prodr. 7: 618 (1838)

Sub-genus IV CHLAMYDANTHE Section 30 Geissostegia

Habit of Plant 1 Height 45 cm. or so.

Stem and Branches 9

Leaves 14, 17 – 18 (linear – subulate – lanceolate - oblong), 24 (erect to squarrose), 27, sub. 29, 31, 34. 2 to 5 mm.

Inflorescence 39, 44, /47 Peduncles 52 - 53 (floccose), 2 mm.

Bracts 57 (subremote) 60 usually ~~longer~~ smaller.

Sepals 65 (narrow-ovate), acute or 68, 72, 75, 80, 81, white, 3 mm

Corolla 82, 84, 103, 104, 96 3-3.5 mm. usually longer than the sepals occasionally less, white to pale pink. Lobes 110, 115, short.

Filaments 120, slightly 119, brodest in middle Anthers 123, /125, 126, 131, 138, 140, slightly 132 (curved), 136, 1⅓ - 1½ mm.; pore ⅗ of cell.

Appendages Awns

Crests

Ovary 155, on a black disc, 159 or 160 (hispidulous) Style /162 generally decurved.

Stigma 166 to sub 167

Flowering Season Spring and summer. Sept. – Mar.

Distribution Cape Prov. Swellendam, Riversdale, George, Uniondale Districts. Mountains to 750 m. or so. Garcia's Pass, Montagu Pass.

Remarks and Varieties Variable in some respects but may be recognized by the loose sepals, deflexed style (in mature flowers) and the prominent, dark disc below the ovary.

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(2) The specimen must be carefully dissected and the main characters recorded. Upon the accuracy of this the success of the operation will depend.

(3) The major group and leaf-arrangement group in which to work having been decided on, one of the most reliable or unusual (if any) characters is chosen first. It is not desirable to use difficult or obviously unreliable characters until the latest stages. Such are the hairiness of the stem and the leaves, often variable with age. In such cases the youngest parts should be scrutinized. The hole applicable is ascertained from the list and then a group of cards is taken out and carefully squared up so that the holes register properly. The needle is inserted through the relevant hole and the cards having that feature are shaken out. Care must be taken that all such cards have fallen out.

In certain cases, as explained in (8) below the cards that do not fall out are those required.

(4) The process is repeated for all cards in the major group and leaf-arrangement group that is in use.

(5) All the cards that have been collected in (4) are put through a similar process with other reliable characters until (7) is reached.

(6) In doing the above, two or more characters can be used consecutively for each lot of cards but, if too many are used, mistakes are very liable to occur.

(7) Finally, and often quite quickly, the cards will be reduced to one or none. In the first case this should be the species sought if no error has been made. Now, any characters punched out but not yet used must be checked with the specimen. If the result is still favourable—well and good—but, if not, the following procedure must be followed as if no cards had been retained. This fact may indicate a new species but, before deciding on this, the whole operation should be repeated, preferably in a different sequence, but still avoiding the use of doubtful characters until the end. Then, if the result is the same it should be verified that the correct major group has been used and, if there is any doubt, the process repeated for another group.

(8) When a hole has been allotted to two opposite characters, one of which must always be present, the list has been marked thus:— 47. Corolline,/Calycine. If the specimen is calycine the card will have /47 on the line for inflorescence. In such a case the cards retained on the needle from the hole 47 are those required.

(9) When there is doubt, e.g. when a corolla is subcalycine, do not use this character.

DISCUSSION AND CONCLUSIONS

In using the edge-punched cards for about 700 species of *Erica* L. it has been found that the method is both rapid and effective. As no particular sequence of characters has to be used, the system can be adapted to a variety of situations. If the unknown specimen lacks some features through absence or damage, the ready use of others allows identification to proceed satisfactorily. Identification is particularly rapid when very unusual property-states are found in the specimen and used. Cards for newly described species and varieties are readily added and the card pack can be kept more or less fully up-to-date.

It can be concluded that the method of using edge-punched cards for keys for larger genera may be advocated for use by specialists and larger herbaria. However, the cost of its reproduction might hinder the issue of such a key for wider use.

REFERENCES

THISTLETON-DYER, W. T., (Ed.) 1905. *Flora Capensis* **IV** (1): 1–315. London: Lovell Reeve & Co.

TABLE 1.

An extract from the list of characters used in the edge-punched card key for *Erica* L., with the corresponding hole numbers for the coding.

Character		*Hole No.*
Stem & Branches		
,, ,, ,,	glabrous or glabrescent	8
,, ,, ,,	+ or — pubescent or hispid	9
,, ,, ,,	floccose, pilose, hirsute, tomentose, villous or woolly	10
,, ,, ,,	viscid or some hairs gland-tipped	11
,, ,, ,,	with prominent leaf scars, cushions or channels	12
Leaves		
,,	2-nate, usually opposite	13
,,	3-nate	14
,,	4-nate	15
,,	5-6-nate or irregular	16
,,	slender, linear	17
,,	wider and + or — rigid	18
,,	leathery, bladder-like	19
,,	very long	20
,,	very short	21
,,	long-petioled and/or tremulous	22
,,	adpressed to the stem	23
,,	erect to spreading	24

Character		*Hole No.*
Leaves		
,,	recurved	25
,,	incurved	26
,,	sulcate	27
,,	+ or — open-backed with revolute margins	28
,,	keeled, round-backed, trigonous or terete	29
,,	not, or scarcely, imbricate	30
,,	glabrous	31
,,	pubescent or hispid	32
,,	floccose, pilose, hirsute, tomentose, villous or woolly	33
,,	at least the younger, ciliate or with glands on the margins	34
,,	setose-ciliate or toothed	35
,,	viscid or with some hairs gland-tipped	36
,,	mucronate, aristate, apical or tipped with a bunch of hairs	37
Inflorescence		
Flowers mostly		
,, ,,	Solitary or in pairs	38
,, ,,	3-nate	39
,, ,,	4-nate	40
,, ,,	umbellate to clustered or irregular	41
,, ,,	capitate, in tight heads	42
,, ,,	+ or — spicate or pseudo-racemose	43
,, ,,	terminal on branches or branchlets	44
,, ,,	In the leaf axils or appearing to be so by abortion of the branchlets	45
,, ,,	44 and 45 on same plant	46
,, ,,	corolline,/calycine	47
,, ,,	cernuous	48
,, ,,	very numerous	49